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ABSTRACT

A group of 81 primary school teachers enrolled in a Bachelor of Education conversion program in Australia was surveyed in 1985 and a similar group of 55 was surveyed in 1987 to compare the numbers and variety of microcomputers purchased and how teachers used them. This study suggests that, because political changes unexpectedly brought reduced funding for a computer education program, teachers will lack the needed skill development in instructional computer applications to prepare children for employment. Additionally, research shows that a supportive school organizational environment determines the success of microcomputers in classroom learning. Data collected from the two groups of teachers included teaching and inservice educational backgrounds, and classroom microcomputer applications. Teachers reported the extent to which microcomputers were "actually" used and how they "should" be used, and identified barriers they perceived to classroom implementation. Analysis reveals that teachers felt interested and challenged, but had reservations about their abilities. Microcomputer applications were restricted to drill and practice and as minor teaching aids. The number of units in schools increased during both years, which emphasizes the need for furthering teachers' competence. The 1987 sample indicates that fewer inservice opportunities have caused teachers to rely on "experts" in their group to teach others, thereby creating an "elite" that appears to dominate computer availability. Schools should foster positive attitudes toward the technology as an integral part of teaching. Five figures and a table of data are contained in the text; 14 references are appended. (CJH)

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MICROCOMPUTERS IN SCHOOL - THE CONFLICT BETWEEN POLITICAL DECISIONS AND EDUCATIONAL EXPECTATIONS.

Paper presented at the joint NZARE and AARE
Conference - Christchurch, New Zealand - December 1987

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ABSTRACT

A group of primary school teachers enrolled in a Bachelor of Education conversion program was surveyed in 1985 and a similar group was surveyed in 1987 in order to compare the numbers and variety of microcomputers purchased and how teachers used them in primary schools.

Data were collected on teaching background, participation in inservice and preservice courses and on various microcomputer applications in the classroom. In addition, teachers were asked to report on the extent to which microcomputers were "actually" used and how they "should be" used, and to identify factors which were perceived as major barriers to effective implementation of the technology in their classrooms.

Analysis of the data revealed teachers felt interested and challenged but had major reservations about their abilities. They also reported that applications of microcomputers were restricted to drill and practice, playing games and as minor teaching aids. The 1985 and 1987 data revealed increases in the number of units in the schools and highlighted the need to further develop teachers' competence and attitudes in order to increase their awareness of the various applications of microcomputers in a school setting. Moreover, buying computers is not enough. The Political rhetoric has not been matched by adequate resources to enable teachers to develop competence in using microcomputers in schools. The results have ramifications for administrators developing school policy and substantial staff development programs in order to foster positive attitudes towards using the technology as an integral part of the teaching process.

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INTRODUCTION

The changing structure of the workforce has led to the need for computer literacy in order for Tomorrow's adults to survive (Leousis 1983). Anderson (1983), suggests that educators and parents are now acknowledging the fact that children need to become computer literate and acquainted with the computer in some respectable fashion. Schools should become more technologically relevant in order to prevent the development of a generation of disenfranchised, easily manipulated adults. Deck (1983), points out this can occur if technology gains cultural acceptance and becomes a primary work tool, which then generates the need for schools to adopt the technlogy and provide training in its use. If educators do not adopt a suitable mode of reaction, education becomes merely the transmission of a body of knowledge without transmitting culture and preparing children for a future of change.

Shears and Dale (1983), state that Australian Politicians and parents have committed themselves to "the utlisation of computers in schools and educational institutions, although it is uncertain whether teachers are as equally committed" (p.75). Groundwater-Smith and Grundy (1987) concur with shears and Dale (1983) but raise serious questions about the financial support needed to assist teachers in using the new technology.

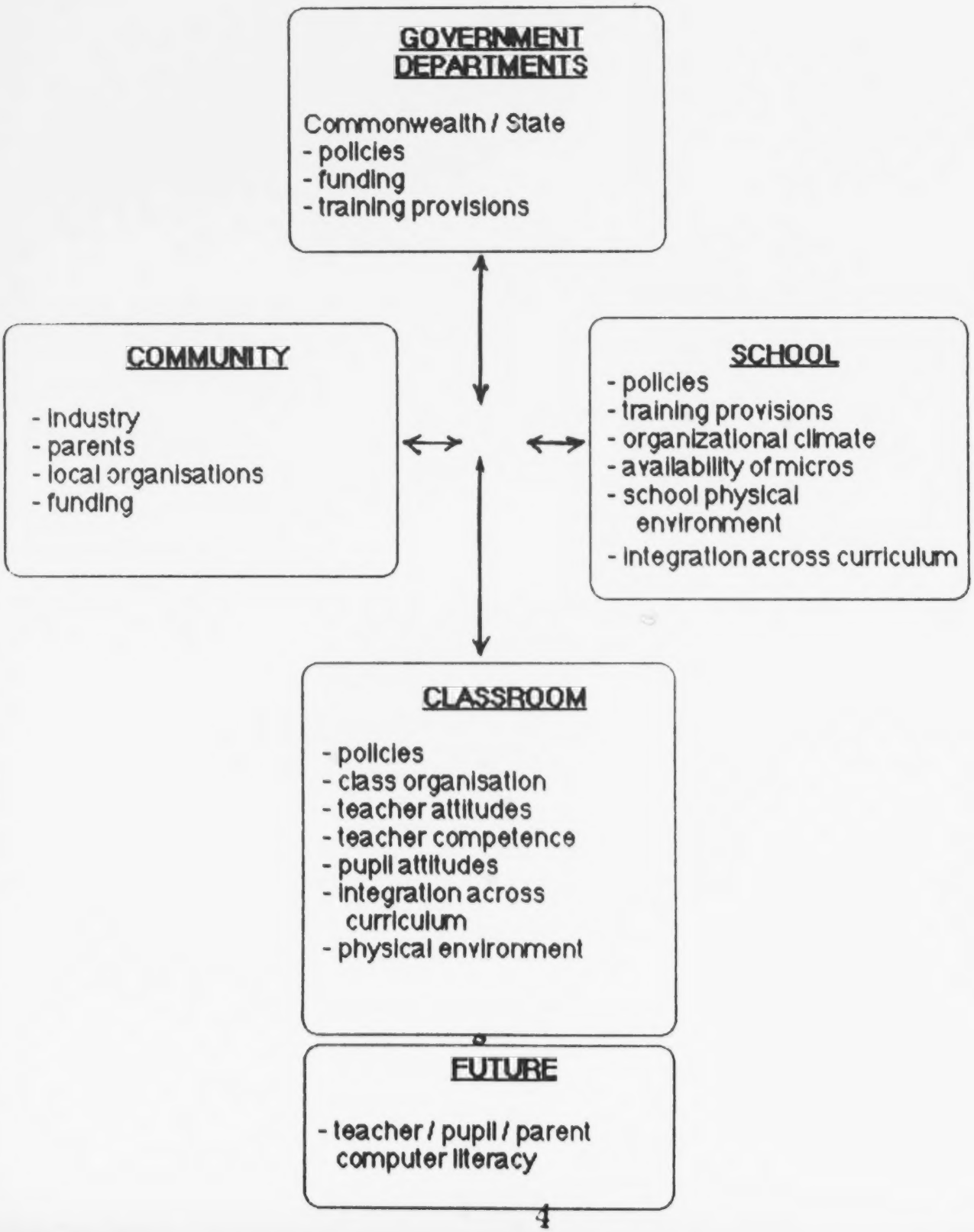
The Australian Commonwealth Schools Commission expressed its views in Recommendations for 1984 and stressed the benefits of a co-ordinated program in computer education and projected the need for financial support estimated at $125m over five years. As a result of subsequent political changes and the establishment of the national advisory committee on computers in schools (NACCS) $18m was made available during the 1984-86 triennium. Compared to what was originally proposed this may be seen as inadequate and may not provide the needed professional development for teachers.

Without this needed financial support teachers are unlikely to develop the necessry skills to operate in a technological environment to facilitate learning. Anderson (1983), suggests the weakest link in the educational use of computers is the lack of experience of teachers who should be trained to allow them to develop skills required to work comfortably with microcomputers when delivering instruction. This view is supported by Bear (1984), who states that placing a microcomputer into the classroom of untrained teachers was found to be ineffective as teachers without training were likely to use microcomputers to do daily trivial things.

Deck (1983, Sinclair and McKinnon 1987) believe the success of microcomputers in education is dependent on the effectiveness of an organisation that is, active participation, enthusiasm, interest and support for the use of microcomputers by students, parents, teachers, administrators and government departments. Absence of this supportive organisational climate creates barriers which hinder extensive implementation of this new technology.

FIGURE 1.

FACTORS INFLUENCING THE USE OF MICROCOMPUTERS IN EDUCATION



These organisational factors impact on the implementation of microcomputers in schools and are incorporated into Figure 1 in order to highlight the relationship and influence of each factor on the total development of primary school policies for present and future use of microcomputers. the "ideal" model forms the basis of this study designed to examine the developments in the use of microcomputers between 1985 and 1987 and to document the changes in their numbers and use over this period of time. In addition, data were collected on teachers' attitudes, competence and perceptions o microcomputers can be used to facilitate instruction and the extent of teacher involvement in the introduction of microcomputers into their schools.

METHOD

This study was designed to compare Primary Teachers' perceptions of various aspects of microcomputers in education and report on changes which may have occurred between 1985 and 1987.

A sample of eighty one primary teachers enrolled in a Bachelor of Education conversion program was surveyed in 1985 and a similar group of 55 teachers was surveyed in 1987.

Data were collected on teaching background, participation in inservice and preservice courses, and on various microcomputer applications in the classroom. In addition, teachers were asked to report on the extent to which microcomputers were "actually" used and how they "should be" used in school. Teachers were also requested to identify factors which were perceived as major barriers to effective implementation of the technology in their classroom.

RESULTS

The biographical data for the 1985 sample revealed 52% had more than seven years teaching experience, 25% had 3-6 years experience while only 12% had less than three years experience. By comparison, in the 1987 sample 31% had more than seven years teaching experience, 22% had 3-6 years experience and 38% had less than three years experience. The balance of the 1985 and 1987 samples were part-time, casual or high school teachers.

Relatively few teachers, 15% in 1985 and 20% in 1987, owned their own microcomputer. Only 9.0% of the 1987 sample were seriously considering purchasing a microcomputer. Participation in inservice and college courses varied slightly. Twenty six percent of the 1985 sample were planning to attend inservice courses in 1985 and 22% were planning to attend college courses. Only 16.4% of the 1987 sample were planning to attend inservice courses and 14.5% were planning to attend college courses.

The nature of the training reported by teachers included learning how to operate microcomputers, write programs, use software and word processing. Full analysis of the nature of training is presented in Figure 2.

There were substantial increases of microcomputers purchased by schools. Approximately 75% of teachers in the 1987 sample reported their schools had microcomputers. In 1985 the numbers reported were 23 apples and 30 microbees. However, in 1987 these numbers had increased to 55 apples and 55 microbees. These were the dominant brands reported by both groups.

The perceived goals most likely to be achieved as a result of using micros are reported in Figure 3. Teachers generally felt micros could be used to increase pupil motivaton, provide remediation for slower learners, and acceleration for advanced pupils. Minor differences existed between the 1985 and 1987 samples particularly in the capacity of micros to inrease pupil mastery of material and to supplement teacher presentations.

The teachers in both samples were asked to identify factors which may have prevented them using micros in their school. The results are presented in Figure 4. The two main factors appear to be ease of access and insufficient knowledge or training.

Differences in Teacher attitudes were evident. The teachers in the 1987 sample appeared to feel more threatened, incompetent, and unsure. Both groups reported they felt challenged and interested. Very few teachers reported micros were irrelevant. Full comparisons between the two samples are presented in Figure 5.

Teachers in both samples were asked to indicate the extent to which microcomputers were "actually" used and "should be" used in a school setting. Their responses were recorded on a five point likert scale ranging from 1 representing very great extent and five representing very limited extent. The means for "actual" and "ideal" were subtracted to provide an indication of the perceived need for change in the use of microcomputers. An examination of the results in Table 1 reveals teachers perceived more emphasis should be given to using microcomputers to assist in administration, record keeping, monitoring progress and developing class lists. Microcomputers are appropriately used for teaching aids, managing resources, drill and practice, and simulations. The Data suggest microcomputers should be used more to carry out many of the listed functions and provide evidence for greater emphasis on the broader application of microcomputers in a school setting.

DISCUSSION

Substantial increases in the numbers of microcomputers had occurred between 1985 and 1987. Microbees and apples appeared to be the dominant units purchased. A few schools had purchased BBC and commodore units.

Comparisons between Teachers' perceptions of the "actual" and "ideal" applications of microcomputers highlighted the limited application of the technology in a school setting. Responses of the Teachers surveyed suggest substantial inservice courses are necessary to develop teacher competence and foster more positive attitudes towards using micros. Many teachers reported they were interested in using

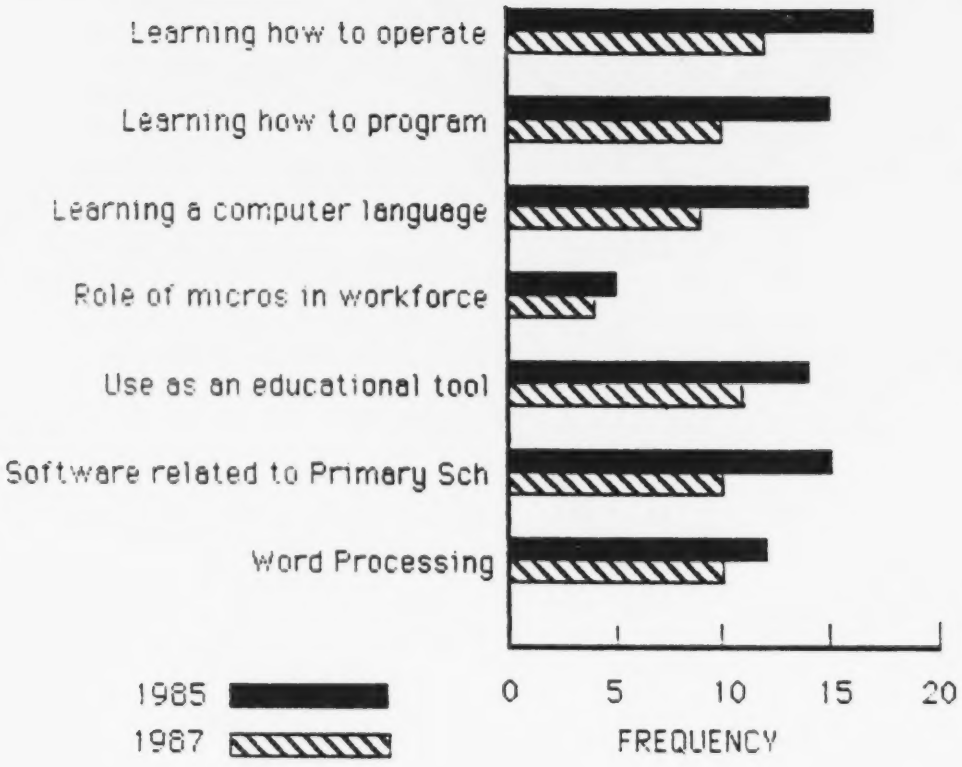


FIGURE 2: NATURE OF THE TRAINING

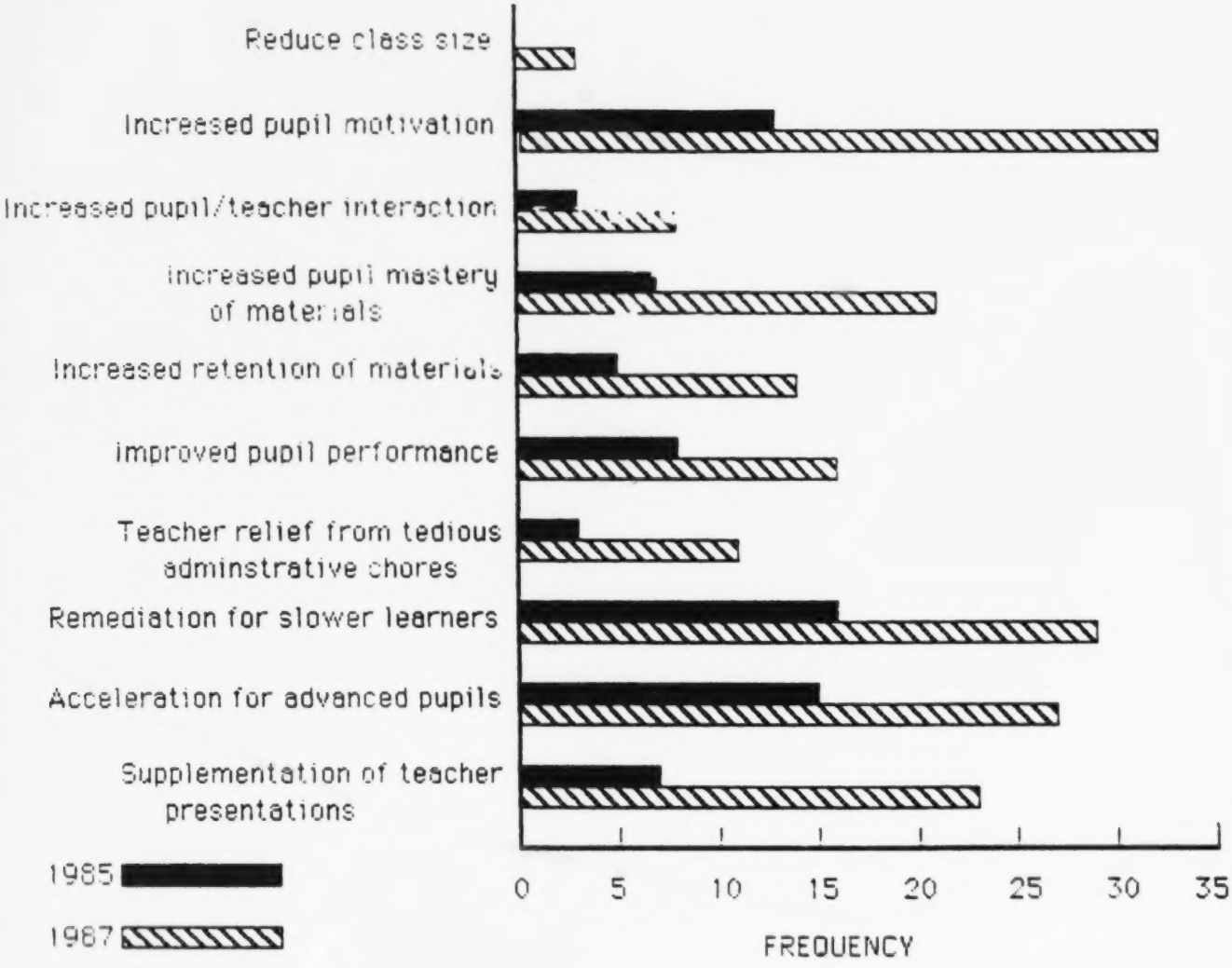


FIGURE 3: GOALS PERCEIVED AS MOST LIKELY TO BE ACHIEVED AS A RESULT OF USING MICROS IN THE SCHOOL/CLASSROOM

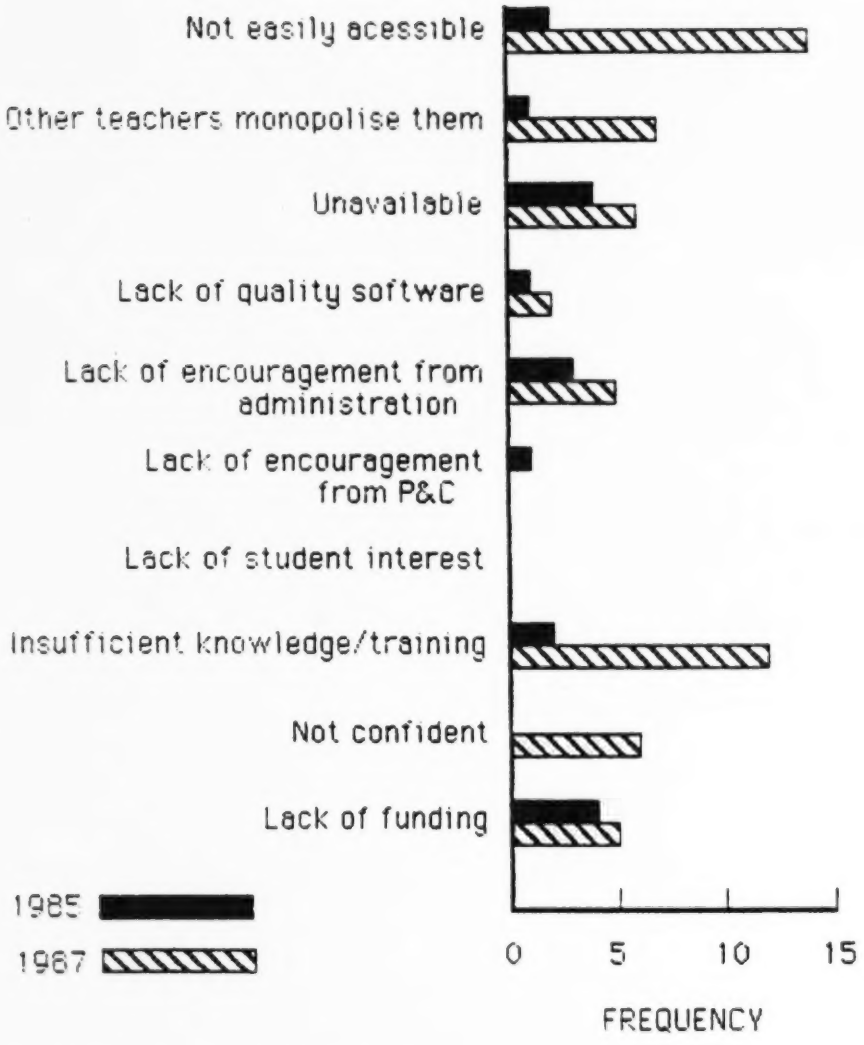


FIGURE 4: FACTORS PREVENTING THE USE OF MICROS

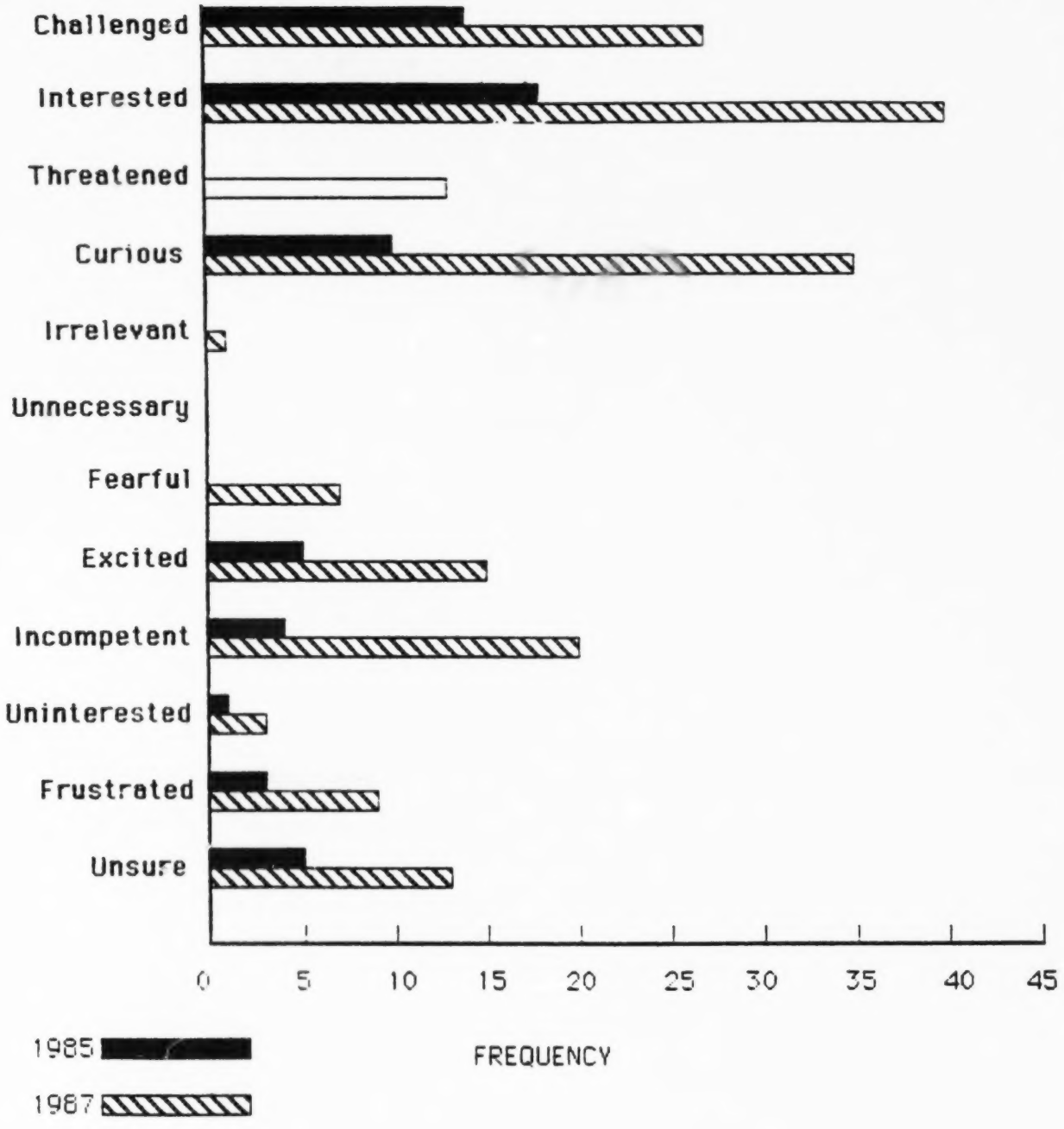


FIGURE 5: TEACHER ATTITUDES TO THE GENERAL USE OF MICROS

TABLE 1

Mean differences between Actual and Ideal uses of microcomputers in school

1 = very great extent
5 = very limited extent

	Mean Difference 1985	Mean Difference 1987
1. Administration	1.5	1.5
2. Timetabling	1.4	1.6
3. Class list	1.7	1.2
4. Record keeping	1.8	1.6
5. Diagnostic	1.4	1.7
6. Teaching aid	1.8	1.0
7. Monitor Progress	1.5	1.5
8. Resource Management	0.8	0.8
9. Drill and Practice	0.9	1.4
10. Tutorial	1.2	1.4
11. Simulations	1.2	1.3
12. Games	0.7	1.1
13. Counsellor to pupils	0.6	0.6
14. Data base	1.4	1.4
15. Word Processor	1.3	1.2

micros but lacked the skill to use the technology effectively in the classroom. School administrators must develop more positive strategies to encourage teachers to participate in inservice courses after school as well as plan staff development activities during school.

The existing evidence highlights the conflict between the political decisions expecting teachers to become "computer literate" and provide the necessary leadership to teach computing in schools and the amount of financial support made available to assist teachers in this role.

Regional directorates of the N.S.W. Department of Education have experienced severe restrictions in the variety and number of inservice courses due to budget cutbacks in the past few years. These difficulties are reflected in the 1987 sample reporting decreased opportunities for inservice courses. Teachers appear to have adjusted to this difficulty by encouraging one or two members of staff to develop the necessary expertise in the hope of undertaking the responsibility of training the rest of the staff. Moreover, these "experts" appear to be responsible for coordinating school policy development and planning computing activities for pupils, teachers, and in some instances, parents.

The major difficulty created by this approach appears to be the development of an "elite" group of staff members who dominate the use of micros and restrict their availability to all teachers, consequently some staff members become frustrated and discouraged.

Comparisons between the 1985 and the 1987 groups on the perceived goals most likely to be achieved by using microcomputers reveal teachers in the 1987 group had much higher expectations of what computers can do. This finding is difficult to explain because the reported training experienced by these teachers was less extensive. They may have developed their knowledge from a variety of sources, the most important being the actual "hands on" experience gained by using units found in their schools. However, they may not have developed sufficient mastery of the many computer applications in order to use them effectively with pupils. For example, they believed micros can increase pupil motivation and mastery learning, provide remediation, as well as acceleration for the more advanced pupils but reported little evidence to suggest many of these activities were being carried out.

A further explanation of these beliefs may relate to the rapid development of suitable software which has become available in the past two years. Many teachers may have heard about or actually inspected these programs but have not used them extensively with pupils in their classrooms.

Substantial developments in the use of micros in the schools have taken place. Many of these developments relate to the hardware and software. These rapid changes do not appear to be matched by the required changes in the teachers' perceptions, attitudes, and competence. School administrators must develop a better understanding of the major barriers preventing teachers from adopting effective applications of the new technology and must develop support structures

within a school to allow teachers time to practice on the micros in order to improve their competence and develop a thorough understanding of the available software and its application.

One simple strategy might include the development of a team approach which requires teachers to actually participate in the activities experienced by pupils when they are taught by the more experienced member of the team. Furthermore, administrators and teachers should be aware of all the factors which impact on the development of a school computer policy and try to adopt procedures which encourage greater use of the teachnology. In this way teachers and pupils will acquire greater confidence and consequently are more likely to become computer literate.

School administrators and teachers should become conversant with community resources and explore ways of encouraging community members to make significant contributions to the development of microcomputer applications in a school setting. It is unrealistic, in the short term, to expect all teachers to use microcomputers as an effective teaching aid.

Administrators and teachers should give careful consideration to the location of micros in their school. The development of any school policy should consider "environmental" barriers which could discourage all teachers from using the micros. Teachers, administrators, and pupils who have easy access to the micros are more likely to be motivated and take the necessary time to sit at the terminals to practise. This is more likely to reduce the reported frustrations experienced by teachers and consequently allow them to improve their computer literacy skills.

National and state advisory bodies should have a major role in developing appropriate leadership strategies to provide guidance, technical, and financial resources for teachers to improve their level of expertise in computer applications in schools. In addition, school administrators should resist sales pressures from manufacturers and salesmen to purchase computers until the school personnel have had ample opportunities to address the problems associated with implementing a computer literacy program within a school and to minimise the conflict which may arise between the decisions of politicians and the educational expectations of teachers who teach the pupils.

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